

ADDRESS OF PROF. G. C. SWALLOW

ON

AGRICULTURAL EDUCATION,

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AGRICULTURAL EDUCATION.

MR. PRESIDENT AND MEMBERS OF THE GENERAL ASSEMBLY:

We all admit that there *is an education* suited to the wants of those entering upon the duties of the learned professions; that no one can expect to attain unto the highest success as a physician, a lawyer or as a preacher, unless he has first received a thorough training in the course of studies prescribed for his particular profession. But some doubt whether there be any education peculiarly adapted to and necessary for the highest degree of excellence in agricultural and mechanical pursuits; and they do not feel the necessity of establishing industrial schools.

As we are now called upon to decide a question which will give the youth of Missouri, for generations to come, a school where they can be trained for the highest excellence in mechanical and agricultural pursuits, or which will deprive them of those advantages for many years to come, it is a matter of great moment to decide wisely.

Were some question to be decided of equal importance to either of the learned professions, or even to the merchants or bankers of the State, as is this question of the industrial college to the farmers and mechanics, you would see such an ingathering about these halls as would secure a full appreciation of the whole subject matter.

We come, as in duty bound by the law creating the State Board of Agriculture, to ask at your hands a patient examination of the whole question, and the adoption of such legislation as will secure to our youth the best possible education to fit them for the farm and workshop. A liberal education has generally taken them to the learned professions; but we wish to give them a liberal education that will increase their love for the industrial pursuits.

The prejudice somewhat prevalent against "book farming," or "scientific farming," arises in part, doubtless, from the fact that some who farm on scientific principles do not always succeed. But this argument is equally strong against those who pursue the "good old way," as they do not always succeed. It would also apply against all learning, as educated men are often less successful. And besides, many who pretend to farm on scientific principles are mere pretenders, who know nothing of science. No one doubts that experience is valuable to the farmer; and science is made up of principles derived from the experience of all who have lived before us—*science is the essence of all experience*. The science of agriculture is derived from the experience of all farmers from Adam to the present time.

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All of us know some of these scientific principles, and others we do not know. We know how to make our gardens yield fruit seven months in the year; but all do not know how the gardens of Alcinous were made to yield fruit *twelve* months in the year.

Washington, who was a *book farmer*, raised better crops than his neighbors; and Lavoisier, a distinguished French savan, doubled the crops of his domain, and quadrupled his profits, by *scientific farming*. Would it not benefit our young farmers to know how these results were obtained? And this is part of what an agricultural college will teach. But this not enough; we want to know more than the results and how they were obtained.

It is a well-known fact that salt has greatly increased crops of wheat; but this fact, without knowing why it is useful, might be even worse than useless to the farmer, as an application of it would in some places prove absolutely injurious. Hence, to render this fact really useful, we must know the composition and food of the wheat plant; how much salt it wants, the composition and structure of the soil; whether it contains salt enough, the location of the soil, the nature of prevailing winds—whether, as in many places, they will convey any salt to the crop. These investigations require a whole range of scientific knowledge—geology and chemistry to understand the soil, vegetable physiology and chemistry for the wheat, and geography and meteorology to determine the effects of the atmosphere and winds.

This fully illustrates the necessity of knowing the whole range of agricultural science, that we may successfully use the facts derived from the experience of others.

Horses are sometimes relieved from severe illness by bleeding; hence some use the lancet whenever the horse shows symptoms of disease, often to the great injury of this noble animal. Therefore it is important to know the physiology of the horse, to understand his diseases and the best remedies for each.

The improved breeds of horses, cattle, sheep, swine, and fowls have been produced by a long and careful investigation of the physical natures of these animals, the food best adapted to their natures, and the crosses calculated to produce any desired results. If these principles are unknown or neglected, the blooded horse will degenerate into the hack, the shepherd's dog into the useless cur, and the Durham into the scrub. All these invaluable principles are fully set forth in the science of *animal physiology*, taught in agricultural schools. In France there are several schools devoted exclusively to educating men for rearing and training horses. It is by these principles, this science, that the wolf, or wild dog, has been converted into the greyhound and the noble New Foundland.

The principles of vegetable physiology are no less important to the farmer. By them our rich cereals have been produced from wild grasses and grains, our delicious apples from the bitter crab, the luscious peach from the dry, wild almond; the tame grape from the wild,

and the potato from a dry, poisonous wild root. And by the same principles of science these products of the farm and the orchard are being constantly improved. These wonderful results of vegetable science the ancients attributed to divine powers, under the name of Pan, Ceres, and Pomona.

But those who may study vegetable physiology in our industrial college, will find their science more propitious than the smiles of the whole catalogue of rural deities.

Scarcely any subject should demand the more serious consideration of the citizen and the State than the exhaustion of the soil. The soil is by far the most valuable of all our possessions. By proper care it may be indefinitely increased in productiveness and value; but, by bad husbandry, it will be gradually exhausted, and finally become a barren waste. Some of the most fruitful regions of the globe have become barren deserts, and a few wild animals now occupy the places where populous nations once dwelt.

Some say this desolation is the result of the curse of God for national sins. If so, I will venture the assertion that their greatest sin was the improvident destruction of forests, and the exhaustive cultivation of soils; as, without these acts, the desolation would have been impossible by the ordinary course of events. Let us be warned by the fate of Babylonia and other Eastern nations, by the exhausted regions in our own country, yea, and by exhausted fields in our own new and fertile State. He who exhausts his soil, wastes the birth-right of his children and undermines the power and prosperity of the State. The State, therefore, should see to it that our forests be preserved, and our soils guarded against deterioration. No power but the knowledge of agricultural science can do this.

Let our farmers know the fertilizing ingredients of soils, and what each crop removes and how it may be restored; and above all, let them fully understand the great wrong and fatal consequences of the exhausting process, and they will soon adopt improved modes of culture. Let them know that one crop of tobacco takes from the soil as much as one hundred crops of hemp; that tobacco has well nigh ruined the fertility of large areas in the older states, and it will become a less popular staple. Let them fully appreciate that a crop of clover will restore to the soil all the fertilizing ingredients removed by a crop of wheat, and clover will more frequently occupy our fields. Let them know of the vast beds of marl beneath large areas of our soils to keep up their productive energies, and they will soon run the subsoil plow deep enough to bring up its rich ingredients and mingle them with the soil.

Let our agricultural college make known these and a hundred other means of promoting the fertility of our lands, and we shall have the best possible guarantee against this great calamity of exhausted soils and depopulated States.

If our industrial college should do this and nothing more, it will

have repaid the State a thousand fold for the most munificent endowment, and for the most anxious care of every statesman and private citizen.

Such are a few hints of the vast storehouse of useful knowledge which an agricultural school would impress upon its pupils. Instead of there being any lack of materials useful to a student of agriculture, the difficulty will be to select a portion small enough to enable the student to master it in the time allotted to the college course.

It is a time-honored maxim that the youth should study what the man is to practice. The whole business of the farmer may be expressed in two words—*aid nature*—make two blades of grass grow where but one grew before. Cultivate the crab apple into the pippin, transform the mountain sheep into the South-Down, and the snarling wolf into the shepherd dog. Such are the ennobling duties of the farmer; his labors are with nature, and his success must depend upon their accordance with nature, or the laws of natural science. Farmers, then, above all men, need a thorough knowledge of *true philosophy* and *natural science*. Let those, therefore, who would be farmers, and would excel in the profession, study the natural sciences, especially those departments that lie at the foundations of practical agriculture.

When Augustus Cesar returned to imperial Rome from the wars which established the empire, he wished to call his veteran soldiers and the people back to their traditional love of agriculture. Land was distributed to the war-worn soldiers, and Virgil was employed to teach them the science and the beauties and glories of rural pursuits.

Those grand old poetical lectures were the theme of every shepherd and herdsman, and the burden of the vine-dresser's song. They inspired new confidence, new love, and new zeal in every department of agriculture.

I would that some master pen or tongue would call us back to our former love of the farm and country life; that our youth of country, village, and city could see a sparkling naiad in every stream and fountain, and a dryad in every tree of forest and copse; that Ceres might lead them to our broad prairies, and Pomona, with her luscious fruit, allure them to the Arcadian valleys and glorious hills of our Ozark highlands; that our maidens, with sparkling eye and glowing cheek, might follow Flora to the blooming fields and Diana to the hills and mountain glades, until the simplicity and beauty and happiness of Eden be restored to all our borders.

In the city is an everlasting struggle between fashion and stable habits; extravagance and penury; integrity and a necessity for money; between blooming chastity and ardent manhood. Amid the luxuries and vitiated atmospheres of cities, health is undermined and the physical powers degenerate; and the constant occurrence of exciting topics and thrilling incidents to excite, and great crises to overtax the intellect, is most detrimental to that equilibrium of powers most desirable in intellectual development.

Hence it happens that no city has within itself the power recuperative to keep up its own financial, physical, and political status.

It is the constant supply of manly men and blooming women from the mountains and valleys and forests and prairies of the country that populates the cities, and constantly infuses new vitality and energy into every department of those hotbeds of civilization.

Nations have been prosperous and stable while the rural populations have prevailed, but they have decayed when metropolitan manners and habits have become dominant.

It is the higher culture of those engaged in metropolitan pursuits, and the consequent facility they possess to become distinguished and obtain public positions, which draw the best talent of the country to the cities. Give us an equal culture for the farmer and the mechanic, and thus open to him equal chances for success and distinction, and let that culture portray the superior pleasures of rural pursuits, and you will have the best possible means of keeping up the proper equilibrium of country and city populations.

Make your industrial college what it should be—a living, ever-multiplying power, to make the country prosperous and happy, and able to compete with the cities for the best talent of the land.

I have thus intimated that there are valuable stores of science, greatly useful to those engaged in industrial pursuits, and that we need some new influences to keep up the proper balance of powers between our rural and metropolitan populations.

What can better diffuse these principles of the industrial sciences than an industrial college? What better to impress our youth with a love of country life than a college whose chairs are filled with men of sound science, in love with the farm and full of living, active powers? Such men will attract pupils, and such men will leave their impress upon the minds they educate.

That we need such a school, and that it should be established at once, has been declared by the people in the most positive and decided terms. For twenty years the newspapers of the State have teemed with facts and arguments to prove its importance; every report and book published upon our resources have proved its utility; and the farmers and mechanics of the State have spoken in the most positive terms, and made these legislative halls eloquent with their memorials for schools suited to their wants.

In 1852, to go back no further, the farmers and mechanics of Boone issued an address to the State and memorial to our legislators. Let me read what they said in 1852:

“FELLOW CITIZENS: To you, who have with us a common interest in all that can promote our success and secure the prosperity of our professions, we appeal for your sympathy, for your aid and co-operation, in our efforts to place the agricultural and mechanical arts of Missouri in that pre-eminence they so richly deserve. While the practical deductions of science have given a new impulse, infused new life and

energy into almost every department of human industry, we are cultivating our farms as did our sires and grandsires before us. While progress is stamped upon everything, the farmer and the mechanic are plodding on 'in the good old way of our fathers.' The result is, we, in this land of mighty forests, are importing and paying three prices for our lumber. Our houses, plankroads, and fences cost twice their usual prices. We go east for our agricultural and mechanical implements of every grade, from the plow to the butter stamp. With iron mountains and inexhaustible coal beds, we import every article of iron, from the anvil to the ten-penny nail. While we are exhausting the virgin wealth of the richest soil the sun shines upon, our crops are no better than those harvested from the once barren hills of New England; and inferior races of stock crop our luxuriant prairies.

"The divine economy wisely provides that we shall eat our bread by the sweat of the brow; yet no divine or human wisdom demands that we shall toil and sweat and sweat and toil on from year to year, simply for the corn-cake and bacon our appetites demand. We believe we can do better—that we can become better farmers and better mechanics.

"In our effort, we ask the sympathy and aid of every profession. We do not ask others to labor for our benefit only, but for theirs also. We are the great heart of the body politic; if its pulsations are languid, the life blood will flow feebly in every department of human industry. We do not ask it as a favor, we demand it as a debt of long standing, one so just that all have frankly confessed the obligation whenever and wherever its claims have been presented.

"We have been freely taxed for the support of public schools, and have contributed liberally for the endowment of colleges and universities, for the education of physicians and clergymen, lawyers and gentlemen; and yet we look in vain for a school where the science of agriculture is practically taught.

"This we contend is wrong; and, as the guardians of our children's inheritance, as the lovers of our common country, we have resolved to do our duty in remedying the evil; that we, who have so freely aided others, will make one manly effort to aid ourselves."

These were the noble views of the farmers and mechanics of Boone sixteen years ago.

In the following winter, 1853, the farmers and mechanics of St. Louis county formed an agricultural and mechanical association. They reiterated the sentiment of their brethren of Boone, and declared their determination "To induce our State to provide a school, or an adjunct to some school, where our sons may be thoroughly and practically taught all those sciences which pertain to the agricultural and mechanical arts."

It may be said, we have good schools now. This is true; and it is doubtless true that the branches provided for are as well taught as their means will permit, and that they answer all the purposes of the

learned professions. We wish them so educated that they can bring all the treasures of science to the improvement of the farm and the workshop.

Our sons can discourse learnedly upon the *feet* and *cavas* of the Greek hexameter, and sing “*Tityre tu patu*” with all the sweet elegance of a Virgil, but they have scarcely dreamed that fixed laws govern the developments of animal and vegetable structure. They are left in stupid ignorance of the glorious miracles of the organic world—the life-giving flow of the sap, and the development of leaf flower and fruit—the pulsations of the life-blood, and the telegraphic connection of the mind, nerve, and muscle. They can measure the height of a lunar mountain and decompose the nebulae of the milky way; yet their science would be at fault in removing a mole-hill, or in compounding a cement to pave a footpath.

In 1865 the State Agricultural and Mechanical Association, in a memorial to the Legislature, use these words:

“Your memorialists cannot better conclude the duties assigned them than by soliciting the favorable consideration by your honorable body of the following resolutions, and recommending immediate action thereon :

“*Resolved*, That the General Assembly of this State is respectfully requested to direct the State Geologist to give special attention to the agricultural interests of the State, to examine the mechanical and chemical properties of all soils and fertilizers, point out the several varieties of soils and the capacities and peculiar properties of each, together with the crops and culture [and] fertilizers adapted to them, respectively; and designate the trees and other plants which grow upon and characterize them, and lay down upon the map, so far as may be, the territory occupied by these several soils.

“*Resolved*, That, in our opinion, the office of State Geologist should be continued until the survey of the whole State is completed.”

The signatures to the memorial are truly significant. W. B. Napton, of the supreme bench, gives it the stamp of sound judgment; John Locke Hardiman, now, alas! no more, one of the very best farmers of the country, and Claiborne Fox Jackson, a farmer and politician, as Benton said, “keen to catch the popular will.”

In obedience to the undoubted will of the people thus expressed, a law was passed making it the duty of the State Geologist to carry out these wishes of the farmers of the State, and collect the soils and secure their analyses and the examination of all their physical properties. This has been done, and a large amount of material provided for the teachers of our agricultural college.

The farmers and mechanics of Buchanan county, and many others, also memorialized the law-makers of those days for an agricultural college. These farmers of the Northwest hold this significant language:

“It is believed that the introduction of a proper system of agricultural education will tend not only to the augmentation of material

wealth, to an increase of the value of property, and to the preservation of our lands from exhaustion by imprudent husbandry, but also to foster the higher interests of society. As farmers constitute the chief bases of the moral strength of the community, and the main pillar of free republican government, it may in some degree be appreciated *how vast and general* in its reflex influence upon all classes would be the beneficial effect of a proper provision for their general improvement in mind and practice, and for the elevation of their pursuits from the low rank of a rude and traditional *art* to the dignity of an important and progressive *science*."

Who can doubt that such a school would make its graduates full peers of the learned professions in all useful and scholarly attainments?

In 1859, the faculty of the University petitioned the curators to establish in the University a school of scientific agriculture and mechanics. They use this language:

"No one can doubt that the young farmer may derive much benefit from the stores of wisdom and experience taught in scientific agriculture and the natural sciences. It must be as useful to him to understand the composition and structure of the soil as it would be to understand the size and form of the lunar mountains. And yet, there is not a school in Missouri that will give them the varied and valuable principles of *scientific agriculture*.

"The school proposed will supply this important hiatus in our system of education, and enable the young man, who cannot spare six years to pass through the regular course, to obtain the education most useful to him, and to graduate honorably in two or three years. And we believe that our young farmers have just as much claim upon the State for an education as the lawyers, physicians, and preachers have."

When the new constitution of the State was formed, this wish of the people, so often and so variously expressed, was crystalized in these noble words:

"Article IX., section 4. The General Assembly shall also establish and maintain a State university, with departments for instruction in teaching, in agriculture, and in natural science."

Nor has this feeling been confined to Missouri; it has pervaded all parts of the land. This demand for an education suited to the industrial classes became so potent that it secured the legislation which has given each State large tracts of land to endow an industrial college.

We boast of our superior advancement, but Europe is far ahead of us in establishing industrial schools. The rulers of Europe, who know their safety depends upon an abundance of food, have long since decided that agricultural schools are necessary to secure the largest possible production. The number and extent of industrial schools in the various countries are truly surprising; and new ones are estab-

lished every year. Some of them equal the largest universities in the number of professors and other facilities for training their numerous pupils.

England has several agricultural schools; one at Ealing was sustained by Lady Byron. Prince Albert had a model farm which he himself superintended.

Ireland had five agricultural colleges in 1850, and her board of education then decided to establish twenty-five others. All public school teachers are required to instruct their pupils in the principles of agriculture.

Prussia had five first-class agricultural schools—twenty-eight of an inferior grade, devoted to special subjects, as meadows, forests, horticulture, sheep, horses, etc., etc., seventy-two experimental farms, and numerous pomological gardens.

France had one hundred and thirty-two extensive agricultural schools, three hundred minor institutions, besides numerous experimental farms and gardens under public patronage. There is a fine school at Dijon, devoted to grape culture and wine-making. A monthly journal devoted to these subjects is issued by this institution. There is scarcely a doubt that the pupils of this school have a more thorough and intelligent knowledge of the climate and soils, and the adaptations of our State to grape growing, than the pupils of our colleges. The facts collected on these subjects by our geological survey are used in the lectures of this school, and were published, with illustrations, in their *Wine Grower's Monthly*, the *Moniteur*, and other journals of the empire.

These facts were esteemed of so much importance to the people of France that more than 100,000 copies were there published and circulated, and yet our own legislators have steadily refused to publish a single copy for our people.

Russia and other European governments have made liberal provisions for industrial education.

It is said that, through the influence of these thousand schools and other causes, the products of Eastern Europe have been doubled during the last half century. And yet, there is not a single school in Missouri where our youth can obtain an industrial education.

Such a state of things is wrong. We contend that the natural sciences, those practical deductions of all the experience of preceding generations, can be so taught as to benefit our professions more than any others. Farmers and mechanics have lived as long, have had as much experience, and have made as many useful discoveries, as lawyers and physicians; and the results of their experience, embodied in the natural sciences, can be made as accessible to the pupil as the principles of law or medicine. The experience of Archimedes and Cincinnatus is as valuable to us as that of Lycurgus and Esculapius to those learned professions; Liebig and Cuvier have done as much for the agricultural and mechanical arts as Blackstone and Hunter for law and medicine.

We therefore ask for the adoption of such measures as will enable our sons to obtain a practical knowledge of all those sciences which pertain to agriculture, mechanics, and mining. We seek the adoption of no Utopian theory, no doubtful experiment. The matter has been tested, and the results have proven most beneficial to the heads and pockets of those interested. That scientific agriculture can make the desert bloom like a garden has been too often demonstrated by experiment to need support at this late day. Many an acre once barren, on the sandy shores of Maryland and Long Island, and among the stony hills of New England, annually yields its rich harvests, a golden tribute to science.

Shall we say, then, that Cesar, and Peter the Great, and Napoleon, and all the rulers of modern Europe, were deceived as to the utility of agricultural education? Why, then, are these nations still increasing their agricultural colleges? Shall we disregard the wishes and convictions of the farmers of our country, whose demands have secured this grant of land? Shall we not listen to the wishes of the farmers and mechanics of our own State, so often and so well expressed in speeches and memorials to our legislators? But the proof is conclusive that we need such a school, and that our people demand a liberal provision for an *industrial college*.

But who shall manage this college of agriculture and mechanics?

We say put it into the hands of live men, who are in sympathy with the progress of the age, and who know the wants of the farm and the workshop. But above all things we want teachers in this school who know how to teach the practical as well as abstract science; and, to secure success, we must have one leading man at least from the workshop and farm, who will be in sympathy with, and who will know the wants of, the farmer and mechanic. And besides, he should have all the knowledge of science and art that would fully fit him for the high station.

He should know how to "speed the plow," and to unfold all the treasures of science. He should love the field and the forest, be at home in the orchard and in the vineyard, and have the *shibboleth* of the herdsman and the shepherd. Above all, he should be in sympathy with man's highest nature. His examples and teachings should be such as would lead our youth to the higher and nobler destinies of life. With such men to inspire our agricultural and mechanical college, we may expect for it a career of usefulness and brilliant successes such as no other school has achieved. And the man whose genius shall give this college a living power; whose learning shall fill it with all the attractions of heaven-born science; whose practical knowledge shall surround it with all that is useful to the toilers of the shop and the farm, and whose zeal and devotion shall inspire our youth with a love for the noble powers of the mechanic and the glorious pursuits of the farmer—that happy man shall stand pre-eminent among the benefactors of the State.

It shall be his mission to dispel the remnants of past prejudices against practical education. He is not to call us from the labors our natures demand, but to restore to those labors the pleasures that surrounded them in Eden. His instructions will bring his pupils into harmony with the laws of the physical universe, and thus relieve them from the burden and weariness of work, brought upon Adam and all his children by breaking the physical and the moral law. Then shall the husbandman control those powers in nature which the poets of antiquity made so potent and beautiful in the characters of Pan and Ceres, and the pleasures so bewitching in the fair nymphs and naiads.

As the genius of Jason killed the dragon that guarded the golden apples of the Hesperides, so shall the genius and science of our agricultural college destroy this prejudice against practical education, and open in still greater abundance the golden harvests of these Hespe-rian climes.

Our prairies of the North and West, as grand and beautiful as Campana, and as rich as the soils of the Nile, will soon be covered with a continuous succession of broad acres in rustling corn and waving grain, and vast herds of fat cattle shall crop the luxuriant herbage. The valleys of our southern border, more beautiful than Arcadia, with suns and winds as genial as Tempe, will surpass the gardens of Alci-nous in the richness and variety of their fruits. These mountains, richer in dews than Hermon, and hills more fruitful than Olivet, will surpass the vine-clad hills of Italy and Greece in the extent of their vineyards, and vie with Falernium and the Rhine in the quality of their wines; and the broad table lands of the Southwest, with foun-tains more limpid than Castalia, will surpass Judea and all the Orient in its flocks and herds.

When industrial education shall have accomplished all these happy results; when the farmer's "Speed the plow" is heard from all our broad prairies; when the rustic pipe of the shepherd shall gladden our southwestern highlands, and when every hillside shall be vocal with the vine-dresser's song, then shall our youth hasten to engage in these rural pursuits as an *everlasting holiday*, and sing with Virgil:

"Would you be strong? go follow up the plow;
Would you be wise? go study fields and flowers;
Go seek your school in nature's sunny bower.

Fly from the city; nothing there can charm—
Seek wisdom, strength, and virtue on a farm;

"Where fraudless innocence and peaceful rest,
Unbounded plains and endless riches blest,
Where caves, and living springs, and airy glades,
And the soft low of kine, and sleepy shades,
Are never wanting."



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